Biological Evaluation
Douglas-fir Beetle Infestation
Targhee National Forest
1973

INTRODUCTION

The Douglas-fir beetle continued to kill large numbers of Douglas-fir trees throughout most of the fir type on the Forest during 1973. The current Douglas-fir beetle outbreak was nurtured in storm damage trees. Following the initial buildup, beetles attacked standing green trees, and tree killing has increased each year since the infestation began in 1969. Although some of the infested windthrown material was harvested, much of this material was uneconomical or impractical to remove. In addition, logging slash left in large clearcut areas on Big Bend Ridge and Bishop Mountain may have contributed to the initial buildup.

This evaluation was compiled from aerial survey records, on-the-ground evaluation surveys, and previous reports. The aerial detection survey was flown in late July and on-the-ground surveys were conducted during early August.

TECHNICAL INFORMATION

Insect: Douglas-fir beetle, Dendroctonus pseudotsugae Hopkins. (Coleoptera:Scolytidae)

Host: Douglas-fir Pseudotsuga menziesii (Mirb).

Type of Damage: Killing of Douglas-fir. Mortality is heaviest in the large trees and commonly occurs in groups of 10-30 trees.

Extent of Outbreak: The extent of the infestation has remained essentially unchanged since last year. Heaviest losses have occurred on Big Bend Ridge, Bishop Mountain, and along the south slope of the Continental Divide (Figure 1).

Location: Dubois, Island Park, and Ashton Ranger Districts, Targhee National Forest, Idaho.

BIOLOGICAL INFORMATION

Using the aerial detection survey map as a guide, several areas were selected for collecting mortality and green stand data. Areas selected

were from locations of various infestation levels. Douglas-fir mortality was recorded on 1/2-chain by 10-chain strip plots. Green stand data were recorded on variable plots using a 10 BAF. The variable plots were located at each end of the strip plots. In each area, the number of strip plots varied from 10 to 14, and the number of variable plots ranged from 12 to 16. Plot data were converted by computer program to trees per acre and the results are tabulated below:

	Trees Per Acre1/						
Area	Live	1973 Hits	1972 Hits	Before	Dead	Other 2/	Total
Ching Creek	134.1	0.4	0.4	3.1	3.9	—	138.0
Sheridan Creek	90.3	1.8	0.7	3.9	6.4	47.9	144.6
East Hotel Creek	91.5	0.3	0.5	1.7	2.5	83.1	177.1
Thurburn Ridge	76.2	4.0	2.5	9.3	15.8	64.1	156.7
Taylor Creek	73.9	4.7	2.7	6.2	13.6	21.4	108.9
Twin Creek Blue	79.5	2.4	0.8	3.1	6.3	—	85.8
Creek McGar	72.1	—	0.6	0.6	1.2	46.0	119.3
Creekry	77.2	—	—	3.0	3.0	—	80.2

1/ These data are summarized by diameter class in the Appendix.

2/ Lodgepole pine, subalpine fir, and Engelmann spruce.

The average cumulative mortality for all areas sampled was 4.9 trees per acre with an additional 1.7 trees per acre currently infested. The 1973 new hits represent an attack ratio of 1.7 new to 1 old. Although no quantitative brood data were taken, observations indicate no unusual brood conditions. Egg galleries were well established with brood in the egg and larval stage.

DISCUSSION

Near record low temperatures in December and January at Island Park, Idaho, created some doubt about brood survival and future trend of the infestation. Overwintering brood mortality must not have been significant for as predicted last year, the number of new attacks increased during 1973. On-the-ground surveys recorded a 1.7 new (1973) attacks for every old (1972) attack. Tree killing in 1974 should exceed the 1973 level and would represent the fourth consecutive year of increasing losses. Normally, the Douglas-fir beetle can only sustain itself in standing trees for 3 to 4 years. Assuming then that no additional storm damaged trees or slash were added to renew the impetus of the infestation, the number of new attacks should decline in 1974.

Effective long-term control can only be accomplished by converting the mature and overmature stands to a more vigorous condition. With stand conditions as they are, reoccurring bark beetle caused losses will continue. The great expanse inaccessibility of much of the infested area, and the high cost of individual tree treatment preclude artificial control as a practical alternative.

RECOMMENDATIONS

Since any action taken at this time would have little effect on the eventual outcome of the infestation, the following recommendations are made in an attempt to utilize more of the infested and threatened timber and to reduce the potential for a new outbreak:

1 Remove windthrown trees before insect broods emerge.

2 Remove currently infested trees where practical. First priority should be in and near ongoing sales and in other accessible areas such as those between and along the edges of clearcuts.

3. Concentrate logging in areas of greatest hazard; i.e., areas having highest concentrations of mature and overmature timber.

Direct control methods (chemical treatment, fall and burn, etc.) are not recommended.

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A P P E N D I X

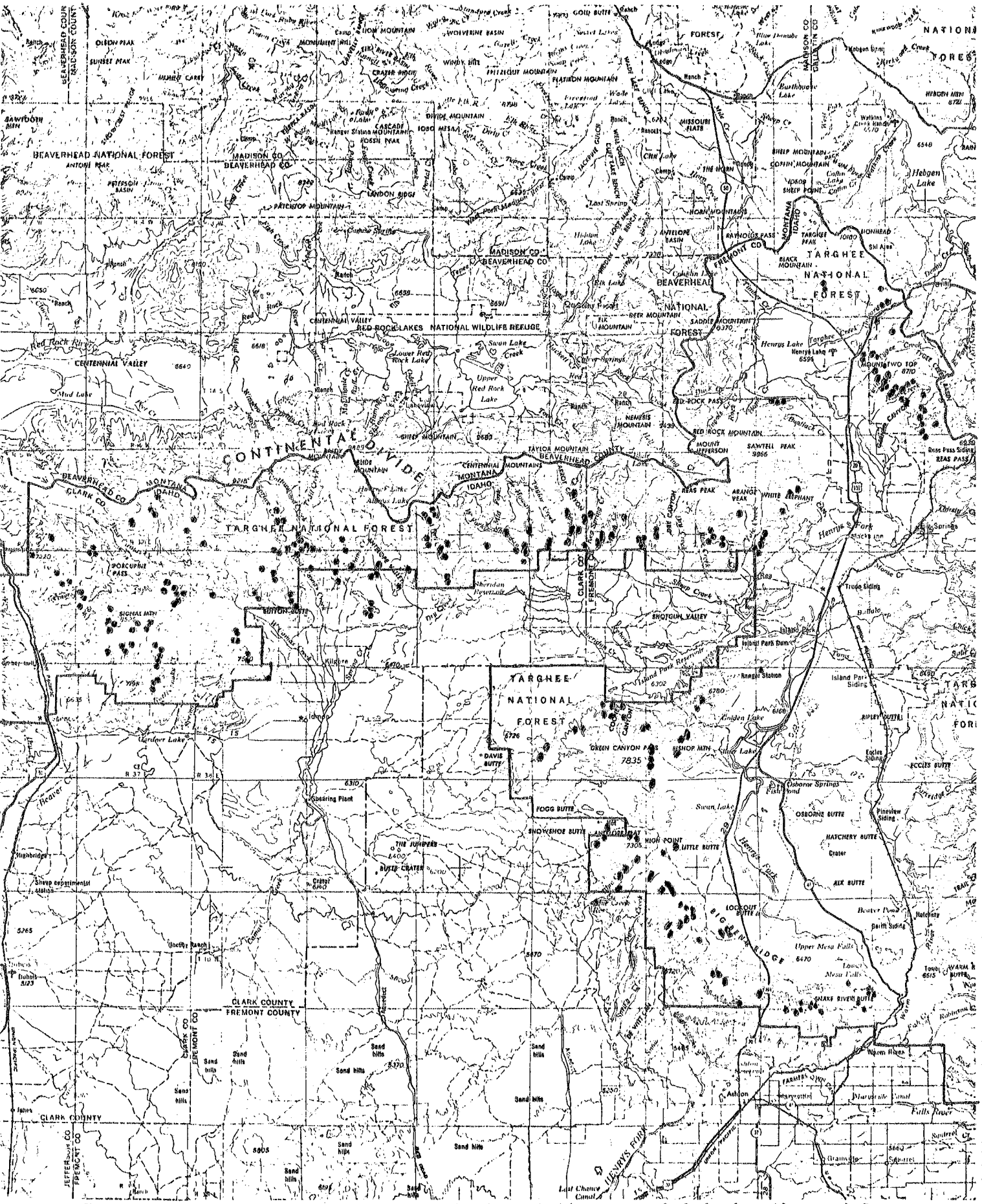

Figure 1. Areas of Douglas-fir beetle infestation recorded during the aerial detection survey, July 1973.

Table 1. Douglas-fir stand structure with mortality by year in Ching Creek, Targhee National Forest.

DBH	Live	1973 Hits	1972 Hits	1971 & Before	Total Dead	Other Live
6	44.6	--	--	--	--	
8	21.5	--	--	0.1	0.1	
10	29.8	--	--	--	--	
12	9.5	--	--	0.3	0.3	
14	15.2	--	--	--	--	
16	4.5	--	--	0.1	0.1	
18	4.2	--	--	--	--	
20	1.1	--	0.1	0.6	0.7	
22	0.5	--	0.2	0.3	0.5	
24	0.4	--	--	0.4	0.4	
26	0.7	--	--	0.1	0.1	
28	0.6	--	0.1	0.4	0.5	
30	0.5	--	--	0.4	0.4	
32	--	--	--	0.1	0.1	
34	0.4	--	--	--	--	
36	0.2	0.3	--	0.3	0.6	
40	0.1	0.1	--	--	0.1	
42	0.1	--	--	--	--	
44	0.2	--	--	--	--	
TOTAL	134.1	0.4	0.4	3.1	3.9	

Table 2. Douglas-fir stand structure with mortality by year in Sheridan Creek, Targhee National Forest.

DBH	Live	1973 Hits	1972 Hits	1971 & Before	Total Dead	Other Live[1/]
6	29.1	--	--	--	--	7.3
8	20.5	--	--	--	--	16.4
10	10.5	--	--	0.2	0.2	5.2
12	5.5	--	--	--	--	5.5
14	6.7	0.2	--	--	0.2	5.3
16	4.1	0.2	--	0.2	0.4	2.0
18	2.4	0.2	--	0.2	0.4	4.0
20	1.3	--	--	0.7	0.7	--
22	4.3	0.3	--	0.5	0.8	--
24	2.3	0.2	--	0.3	0.5	1.4
26	1.2	0.2	--	0.2	0.4	0.8
28	1.3	--	0.3	0.5	0.8	--
30	0.3	0.3	0.2	0.2	0.7	--
32	0.3	0.1	--	--	0.1	--
34	0.5	0.1	--	0.5	0.6	--
36	--	--	0.2	--	0.2	--
38	--	--	--	--	--	--
42	--	--	--	0.2	0.2	--
44	--	--	--	0.2	0.2	--
TOTAL	90.3	1.8	0.7	3.9	6.4	47.9

1/ Lodgepole pine and subalpine fir.

Table 3. Douglas-fir stand structure with mortality by year in East Hotel Creek, Targhee National Forest.

DBH	Live	1973 Hits	1972 Hits	1971 & Before	Total Dead	Other Live[1/]
6	--	--	--	--	--	12.7
8	17.9	--	--	--	--	17.9
10	18.3	--	--	--	--	39.0
12	9.5	--	--	--	--	8.0
14	8.2	--	--	0.1	0.1	2.3
16	9.0	--	--	--	--	2.7
18	9.9	--	0.1	0.1	0.2	--
20	5.7	--	--	0.1	0.1	--
22	5.2	--	--	0.3	0.3	0.5
24	3.6	0.1	--	0.4	0.5	--
26	1.0	--	--	0.3	0.3	--
28	2.0	--	--	--	--	--
30	0.3	0.1	0.3	0.1	0.5	--
32	0.4	--	0.1	--	0.1	--
34	0.2	--	--	--	--	--
36	0.2	--	--	0.1	0.1	--
38	--	0.1	--	0.1	0.2	--
40	0.1	--	--	--	--	--
48	--	--	--	0.1	0.1	--
TOTAL	91.5	0.3	0.5	1.7	2.5	83.1

1/ Lodgepole pine, subalpine fir Engelmann spruce

Table 4. Douglas-fir stand structure with mortality by year on Thurburn Ridge, Targhee National Forest.

DBH	Live	1973 Hits	1972 Hits	1971 & Before	Total Dead	Other Live[1/]
6	19.1	--	--	0.7	0.7	31.8
8	3.6	--	--	0.3	0.3	10.7
10	13.8	0.1	--	0.3	0.4	16.0
12	4.8	0.1	0.3	0.6	1.0	3.2
14	5.8	0.1	0.3	0.6	1.0	1.2
16	8.1	0.9	0.4	0.4	1.7	1.8
18	5.0	0.7	0.9	1.1	2.7	--
20	4.6	0.4	0.1	1.3	1.8	--
22	5.7	0.3	--	0.9	1.2	--
24	2.0	0.6	0.3	0.9	1.8	--
26	2.4	0.3	--	0.6	0.9	--
28	--	0.3	--	0.1	0.4	--
30	0.8	--	--	0.4	0.4	--
32	--	--	--	0.1	0.1	--
34	--	--	--	0.4	0.4	--
36	--	0.1	0.1	--	0.2	--
38	0.2	0.1	--	0.1	0.2	--
40	0.1	--	--	0.4	0.4	--
42	0.1	--	0.1	--	0.1	--
44	0.1	--	--	0.1	0.1	--
TOTAL	76.2	4.0	2.5	9.3	15.8	64.7

1/ Lodgepole and subalpine fir.

Table 5. Douglas-fir stand structure with mortality by year in Taylor Creek, Targhee National Forest.

DBH	Live	1973 Hits	1972 Hits	1971 & Before	Total Dead	Other Live[1/]
6	--	--	--	0.2	0.2	7.3
8	16.4	--	--	0.3	0.3	--
10	15.7	--	--	1.0	1.0	7.8
12	9.1	0.3	--	0.3	0.6	3.6
14	9.4	0.5	0.3	--	0.8	2.7
16	6.1	0.5	--	0.3	0.8	--
18	3.2	0.3	0.2	--	0.5	--
20	3.2	0.3	--	0.3	0.6	--
22	3.2	0.2	0.2	0.2	0.6	--
24	1.8	0.2	--	--	0.2	--
26	2.3	0.2	0.7	0.5	1.4	--
28	2.0	0.3	0.2	0.7	1.2	--
30	0.6	0.3	0.2	0.3	0.8	--
32	--	0.7	0.3	0.7	1.7	--
34	0.5	0.5	--	0.7	1.2	--
36	0.2	--	0.3	0.5	0.8	--
38	0.2	--	--	--	--	--
40	--	--	0.2	--	0.2	--
42	--	0.2	--	--	0.2	--
44	--	0.2	--	--	0.2	--
46	--	--	--	0.2	0.2	--
50	--	--	0.1	--	0.1	--
TOTAL	73.9	4.7	2.7	6.2	13.6	21.4

1/ Lodgepole pine and subalpine fir.

Table 6. Douglas-fir stand structure with mortality by year in Twin Creek, Targhee National Forest.

DBH	Live	1973 Hits	1972 Hits	1971 & Before	Total Dead	Other Live
6	27.2	0.2	--	--	0.2	
8	22.9	--	--	--	--	
10	4.9	0.2	--	--	0.2	
12	1.7	--	--	0.5	0.5	
14	10.0	--	0.2	--	0.2	
16	3.8	0.3	0.2	0.2	0.7	
18	1.5	0.2	--	0.5	0.7	
20	1.8	0.5	--	0.3	0.8	
22	2.5	0.3	--	0.3	0.6	
24	6.4	--	--	0.8	0.8	
26	1.1	0.3	0.2	0.3	0.8	
28	0.9	--	0.2	--	0.2	
30	0.5	--	--	--	--	
32	--	0.2	--	0.2	0.4	
38	0.2	0.2	--	--	0.2	
42	--	--	--	--	--	
52	0.1	--	--	--	--	
TOTAL	79.5	2.4	0.8	3.1	6.3	

Table 7. Douglas-fir stand structure with mortality by year in Blue Creek, Targhee National Forest

DBH	Live	1973 Hits	1972 Hits	1971 & Before	Total Dead	Other Live[1/]
6	25.5		--	--	--	25.5
8	10.7		--	--	--	7.1
10	11.5		--	--	--	6.9
12	6.4		--	--	--	3.2
14	5.8		--	--	--	2.3
16	4.5		--	--	--	1.0
18	2.1		--	--	--	--
20	1.1		0.4	0.3	0.7	--
22	1.4		--	0.1	0.1	--
24	0.4		--	--	--	--
26	1.0		0.2	--	0.2	--
32	0.7		--	--	--	--
34	0.2		--	0.1	0.1	--
36	0.4		--	--	--	--
38	0.2		--	--	--	--
40	0.1		--	--	--	--
46	0.1		--	--	--	--
48	--		--	0.1	0.1	--
TOTAL	72.1		0.6	0.6	1.2	46.0

[1/] Lodgepole pine

Table 8. Douglas-fir stand structure with mortality by year on McGarry Mountain, Targhee National Forest.

DBH	Live	1973 Hits	1972 Hits	1971 & Before	Total Dead	Other Live
6	25.5					
8	14.3					
10	--					
12	2.1			0.2	0.2	
14	9.4			--	--	
16	3.6			0.6	0.6	
18	5.7			0.6	0.6	
20	6.9			0.2	0.2	
22	2.5			0.6	0.6	
24	3.2			0.2	0.2	
26	1.8			--	--	
28	1.6			--	--	
30	0.3			0.2	0.2	
32	--			0.2	0.2	
34	0.3			--	--	
36	--			--	--	
38	--			0.2	0.2	
TOTAL	77.2			3.0	3.0	